ABSTRACT

INTRODUCTION:

Urinary tract infection is a common cause of morbidity in patients suffering from Diabetes mellitus.From Microbiological perspective, urinary tract infection exists when pathogenic microorganisms are detected in urine, urethra, bladder, kidney or prostate. In most instances, growth of $>10^5$ organisms per milliliter from a properly collected midstream clean catch urine samples indicates infection.Among the organisms producing urinary tract infections, Gram negative bacteria were the most frequently isolated out of which Escherichia coli was the most common.

An increased incidence of antibiotic resistance mechanisms like extended spectrum betalactamase (ESBL) , Amp C and metallobetalactamase producing strains among Gram negative bacterial isolates has resulted in a limitation of therapeutic alternatives, causing treatment failures and are increasing in occurrence worldwide [6][4].

The purpose of this study is to determine the bacteriological profile and to detect ESBL, Amp C and MBL production in diabetic patients with urinary tract infection.

AIMS AND OBJECTIVES

1. To determine the prevalence of urinary tract infection in patients with type 2 Diabetes mellitus
2. To identify the various bacteria producing urinary tract infection in patients with Type 2 Diabetes mellitus
3. To identify the antibiotic sensitivity pattern in the organisms isolated
4. To detect ESBL, Amp C and metallo betalactamase production among the identified organisms by phenotypic screening and confirmatory tests.
5. To detect the specific genes encoding ESBL, Amp C and MBL production in the resistant organisms isolated.

MATERIALS AND METHODS:

The study was conducted for a period of one year from June 2017 to May 2018 in the Department of Microbiology, Government Kilpauk Medical college,Chennai.305 midstream cleancatch urine samples were collected from patients with Type 2 Diabetes mellitus from the Institute of Diabetology, Government Kilpauk Medical College, Chennai and categorised into symptomatic and asymptomatic urinary tract infection. The urine samples were evaluated from the presence of urinary tract infection based on direct microscopy, culture , biochemical reactions and antibiotic susceptibility. Growth of more than 10^5 CFU/ml and >5 pus cells /hpf will be considered as significant bacteriuria and processed. The antibiotic resistance profiles were detected based on phenotypic screening and confirmatory tests as per CLSI guidelines. The ESBL production was screened by ceftazidime and cefotaxime resistance by disc

diffusion test and confirmed by combined disk test. The Amp C production is screened with cefoxitin disc by disc diffusion method and confirmed using Amp C disc test. The MBL production is initially screened by detecting the resistance to Imipenem on disk diffusion and later confirmed by Imipenem-EDTA combined disc test ,MBL E Test and modified Carbapenem Inactivation method(mCIM)

Genotypic confirmation by PCR was performed for ESBL using $bla_{CTX-M,}$ bla_{TEM} and bla_{SHV} genes, Amp C using bla_{AmpC} gene and for MBL using bla_{VIM} and bla_{NDM} gene

RESULTS

Out of the 305 urine samples collected, 142 were symptomatic UTI and 163 were asymptomatic. The prevalence of UTI in patients with Type 2 Diabetes mellitus was 30.5%.The prevalence of symptomatic UTI 38.1% and asymptomatic UTI was 23.9%.was The most common organism isolated was Escherichia coli followed by Staphylococcus aureus ,Enterococcus faecalis and Klebsiella pneumoniae. The antimicrobial susceptibility pattern showed maximum sensitivity to Meropenem, Amikacin and Piperacillin Tazobactam. The prevalence of ESBL in the isolates was 33.9%, AmpC was 17.7% and MBL was 4.8%.

CONCLUSION

The study focuses on the early detection of the emerging antibiotic resistance patterns in organisms causing UTI in the diabetic population, which is

a very crucial step to curb the dissemination of resistant strains of organisms in the community. Periodic screening for Urinary tract infection in patients with Type 2 Diabetes mellitus may be helpful in early detection and reduction of the morbidity of the patients.Urgent attention needs to be paid to the accurate and effective management of these infections to retain the efficacy of the existing antibiotics and thereby reduce patient morbidity and mortality.

Keywords : Type 2 Diabetes mellitus, Urinary tract infection, ESBL, Amp C, MBL, $bla_{CTX-M,}$ $bla_{TEM,}$ $bla_{SHV,}$ bla_{AmpC} ,$bla_{NDM,}$